

REMARKS

This request for reconsideration is filed in response to the final Office Action dated July 15, 2010. For the following reasons this application should be allowed and the case passed to issue.

Claims 15-25 are pending in this application. Claims 15-25 have been rejected. Claims 1-14 were previously canceled.

Claim Rejections Under 35 U.S.C. § 103

Claims 15-23 and 25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. (US 6,455,179) in view of Tanaka et al. (U.S. Pat. No. 6,803,142) and Iwamura (US 6,400,122). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of the invention, per claim 15, is a fuel cell assembly mounted in a vehicle comprising a fuel cell stack comprising plural fuel cells stacked in a fixed direction and a pair of end plates which are stacked on both ends of the plural fuel cells. A stacking bolt penetrates the pair of end plates in the fixed direction and maintains the plural fuel cells in a stacked state. A case houses the fuel cell stack, and a bolt penetrates an end plate and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located exterior to the case to support the fuel cell stack to the case.

Another aspect of the invention, per claim 18, is a fuel cell assembly mounted in a vehicle comprising a fuel cell stack comprising plural fuel cells stacked in a fixed direction. A stacking bolt is disposed along the fixed direction to maintain the plural fuel cells in a stacked state. A fluid supply/discharge block is fitted to an end of the fuel cell stack to supply fluid from

outside to each of the plural fuel cells and discharge fluid from each of the plural fuel cells to outside. A case houses the fuel cell stack and the fluid supply/discharge block, and a bolt penetrates the fluid supply/discharge block and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located exterior to the case to support the fuel cell stack to the case.

Sugita et al., Tanaka et al., and Iwamura, whether taken in combination, or taken alone, do not suggest the claimed fuel cell assemblies because the cited references do not disclose a fuel cell stack comprising plural fuel cells stacked in a fixed direction, a stacking bolt which penetrates the pair of end plates in the fixed direction and maintain the plural fuel cells in a stacked state, a case housing the fuel cell stack, and a bolt which penetrates an end plate and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located exterior to the case to support the fuel cell stack to the case, as required by claim 15; and a fuel cell stack comprising plural fuel cells stacked in a fixed direction, a stacking bolt disposed along the fixed direction to maintain the plural fuel cells in a stacked state, a fluid supply/discharge block, a case housing the fuel cell stack and the fluid supply/discharge block, and a bolt which penetrates the fluid supply/discharge block and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located exterior to the case to support the fuel cell stack to the case, as required by claim 18.

The bolt penetrating the end plate and the case or the fluid supply/discharge block in a direction perpendicular to the fixed direction, according to the present invention, provides improved support of the structure of the fuel cell stack against a horizontal load acting between the fuel cell stack and the case not provided by the fuel cell assembly of Sugita et al. and Tanaka et al.

For the Examiner's convenience, the present invention will be contrasted with Sugita et al. by referring to an embodiment depicted in Fig. 1 of the present invention and Fig. 2 of Sugita et al. Claim 15 requires that the bolt (8) penetrates an end plate (5) and the case (3, 11) in a direction perpendicular to the fixed direction such that both ends of the bolt are located exterior to the case to support the fuel cell stack to the case. Claim 18 requires that the bolt (7) penetrates the fluid supply/discharge block (6) and the case (3, 11) in a direction perpendicular to the fixed direction such that both ends of the bolt are located exterior to the case to support the fuel cell stack to the case.

Sugita et al. do not disclose the bolts penetrating the fluid supply/discharge block and the case

In Sugita et al., the bolt (166a, b) penetrates the bracket (162a, b), but does not penetrate the fluid supply/discharge block (28) nor the end plate (24). Further, Sugita et al. do not disclose a case housing the fuel cell stack, and hence does not disclose a bolt which penetrates the housing.

Tanaka et al. do not disclose the bolt with both ends located on the exterior of the end plate

Tanaka et al. do not cure the deficiencies of Sugita et al. In Tanaka et al., the bolt (104) penetrates the bottom of the case (10) and reaches the interior of the end plate (62). However, the bolt (104) does not penetrate the end plate (62). Thus, both ends of the bolt are not located on the exterior of the end plate (62).

The combination of Iwamura, Sugita et al., and Tanaka et al.

does not suggest the claimed configuration

Iwamura is not analogous art:

Iwamura does not cure the deficiencies of Sugita et al. First of all, Iwamura is not analogous art. A prior art reference is analogous if the reference is in the field of Applicant's endeavor or if not, the reference is reasonable pertinent to the particular problem with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). Iwamura is not in the field of Applicant's endeavor. Unlike the present invention, Sugita et al., and Tanaka et al., Iwamura is not directed to a fuel cell stack, but rather, to a group of cylindrical batteries. Furthermore, Iwamura is not reasonably pertinent to improving the supporting structure of a vehicle-mounted fuel cell stack. Thus, Iwamura is not analogous art, and it is improper to combine Iwamura with Sugita et al. and Tanaka et al. to achieve the present invention.

The present invention is further distinguishable from any combination of Iwamura with the other cited references because combining Iwamura with Sugita et al. and Tanaka et al., even if it were obvious to do so, and Applicant maintains it is not, would not result in the claimed fuel cell assembly structure.

Iwamura does not disclose the stacking direction:

Firstly, the batteries 1 of Iwamura are not stacked like the fuel cells of the present invention, and therefore, Iwamura does not define a stacking direction. Rather, the batteries of Iwamura are held in place by circular recesses in the supports 2, 3. Hence it is not possible to specify a stacking direction in Iwamura. The fixed direction in claim 15 is defined by the

stacking direction of the fuel cells. If there is no defined stacking direction it is not possible to arrange the bolt to penetrate an end plate and the case in a **direction perpendicular to the fixed direction**, or the stacking direction, as in claim 15.

Iwamura does not disclose both ends of the bolt are located on the exterior of the case:

Further, Iwamura does not disclose that bolt 27 penetrates the stacked casing 8, 9 such that both ends of the bolt are located on the exterior of the of the case, as required by claims 15 and 18. There is no disclosure or figure showing both ends of bolt 27 are located on the exterior of casings 8, 9 to support the fuel cell stack to the casings 8, 9.

Iwamura does not disclose both claimed bolts:

Furthermore, the Examiner does not specify which bolt is the stacking bolt in Iwamura. If the bolt 27 of Iwamura corresponds to the bolt which penetrates an end plate of claim 15, there must be a stacking bolt that is perpendicular to the bolt 27. Iwamura, however, does not disclose or suggest such a stacking bolt.

The Examiner found, "Iwamura further teaches a through bolt 27 passing through the casing (9), which serves as an endplate because it is located at the end of the row batteries and holds them in a row" (Office Action, page 6, lines 3-5). The bolts 27, however, do not hold the batteries in a row. As clearly shown in Figs. 2 and 3, the batteries are held in rows by the recess in the supports 2, 3.

While the Examiner might consider the batteries 1 of Iwamura shown in FIG. 6 are stacked horizontally and the members 9 serve as the end plates as a result of the bolts 27 penetrating each of the members 9, this interpretation of Iwamura would not suggest the claimed

fuel cell structure, because there is **no stacking bolt** in Iwamura, which penetrates the pair of end plates in the fixed direction and maintains the plural fuel cells in a stacked state.

The present claims require both a **stacking bolt** which penetrates the pair of end plates in the fixed direction and a **bolt** which penetrates an end plate and the case in a **direction perpendicular to the fixed direction** such that **both ends** of the bolt are located on **the exterior to the case**. No combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which penetrates an end plate in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case.

It is readily apparent that the Examiner's basis for concluding that it would have been obvious to combine the cited references in the manner asserted is rooted in impermissible hindsight reasoning in view of Applicant's disclosure.

Hindsight reasoning:

In addition to the impermissible hindsight reasoning employed in combining Iwamura with Sugita et al. and Tanaka et al., impermissible hindsight reasoning was also used in combining Tanaka et al. with Sugita et al. The Examiner noted that Tanaka et al. teach that mounts (123, 130) give the housing structure that allows it to withstand the load concentration on the mount. The Examiner then reaches an unsupported conclusion that it would be desirable for the bolts of Sugita et al. to penetrate the supply block instead of a bracket since it would provide more support for the fuel cell system by changing the load concentration, as Tanaka et al. teach the importance of load concentration (pages 4-5 of Final Office Action). The Examiner's position is totally unsupported by the references. Tanaka et al. discuss positioning a reinforcement member (300) about a mount (82) to reduce the load concentration on the mount

(82). There is no suggestion at all in Tanaka et al. of bolts penetrating the supply block.

Therefore, neither Sugita et al., Tanaka et al., nor Iwamura disclose a bolt which penetrates an end plate and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case to support the fuel cell stack to the case, as required by claim 15. With respect to the Claim 18, neither Sugita et al., Tanaka et al., nor Iwamura disclose a bolt which penetrates the fluid supply/discharge block and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case to support the fuel cell stack to the case.

Response to Arguments

In the Response to Arguments section, the Examiner that maintained that impermissible hindsight reasoning was not used because only knowledge that was within the level of ordinary skill at the time the invention was made. Applicant disagrees. As explained above, one of ordinary skill cannot achieve the claimed configuration based on the prior art disclosures because no combination of the cited references suggests the specific configuration of the fuel cell stacks, stacking bolt, and bolt which penetrates an end plate in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case. Therefore, Applicant's own disclosure must have been relied on to reconstruct the claimed fuel cell assemblies.

The Examiner also maintained that Sugita et al. and Tanaka et al. are analogous references. As explained above, the test for determining whether prior art references are analogous prior art was set forth in *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). A prior art reference is analogous if the reference is in the field of Applicant's endeavor

or if not, the reference is reasonable pertinent to the particular problem with which the inventor was concerned. Iwamura is not in the field of Applicant's endeavor. Unlike the present invention, Sugita et al., and Tanaka et al., Iwamura is not directed to a fuel cell stack, but rather, to a group of cylindrical batteries. Furthermore, Iwamura is not reasonably pertinent to improving the supporting structure of a vehicle-mounted fuel cell stack. The Examiner defines the field of endeavor as "housing structures." The Examiner's definition is unreasonably broad, as "housing structures" would apply to any container, box, bag, enclosure, etc. One of skill in this art would not consider every possible housing structure. Rather, one of ordinary skill would consider housing structures that were reasonably pertinent to housing a fuel cell stack. For example, as shown in Sugita et al. and Tanaka et al. fuel cell stacks comprise a series of substantially parallel plates in tight, physical contact with each immediately adjacent plate, and stacked together in a stacking direction. Iwamura, on the other hand teaches a container holding a plurality of self-contained cylindrical enclosures. There is no requirement that the cylinders in Iwamura be held in tight, physical contact with each immediately adjacent plate. Because each individual cylinder in Iwamura is sealed, it is not necessary that the cylinders be in tight, physical contact. In fact, Figs. 1 and 2 of the Iwamura show that immediately adjacent cylinders are not in physical contact. Therefore, it is readily apparent that the problems facing one of ordinary skill in the art of fuel cells, such as maintaining the integrity of a fuel cell stack, would be of no concern to Iwamura, and are not addressed by the disclosure of Iwamura.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329,

1335 (Fed. Cir. 22006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). There is no suggestion in Sugita et al., Tanaka et al., or Iwamura to modify the fuel cell assembly of Sugita et al. so that it includes a stacking bolt which penetrates the pair of end plates in the fixed direction and maintain the plural fuel cells in a stacked state, and a bolt which penetrates an end plate and a case in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case to support the fuel cell stack to the case, as required by claim 15; or a stacking bolt disposed along a fixed direction to maintain the plural fuel cells in a stacked state, and a bolt which penetrates a fluid supply/discharge block and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case to support the fuel cell stack to the case, as required by claim 18, nor does common sense dictate such modifications. The Examiner has not provided any evidence that there would be any obvious benefit in making such modifications of Sugita et al., rather there appear to many shortcomings to the asserted modifications, as explained above. *See KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. ____ (No. 04-1350, April 30, 2007) at 20.

The **only** teaching of the claimed fuel cell assemblies is found in Applicant's disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 24 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Sugita et al. view of Tanaka et al. and Iwamura, and further in view of Groppel (US 3,856,573). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The combination of Groppel with Sugita et al., Tanaka et al., and Iwamura does not suggest the claimed fuel cell assemblies because Groppel does not cure the deficiencies of Sugita et al., Tanaka et al., and Iwamura. Groppel does not suggest a stacking bolt disposed along a fixed direction to maintain the plural fuel cells in a stacked state, and a bolt which penetrates the fluid supply/discharge block and the case in a direction perpendicular to the fixed direction such that both ends of the bolt are located on the exterior of the case to support the fuel cell stack to the case, as required by claim 18.

The dependent claims are allowable for at least the same reasons as the independent claims from which they depend and further distinguish the claimed fuel cell assemblies.

In view of the above remarks, Applicant submits that this application should be allowed and the case passed to issue. If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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